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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------------|--------------------------|
| 10/625,361 | 07/23/2003 | Peter Michael Edic | 120520-2/YOD GERD:0051 | 8219 |
| 7590 | 12/10/2004 | | | EXAMINER SONG, HOON K |
| Patrick S. Yoder FLETCHER YODER P.O. Box 692289 Houston, TX 77269-2289 | | | ART UNIT 2882 | PAPER NUMBER |

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------|--------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/625,361 | EDIC ET AL. | |
| | Examiner | Art Unit | |
| | Hoon Song | 2882 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-6,22-24,37-41 and 56-58 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) 7-21,25-36 and 42-55 is/are allowed.
- 6) Claim(s) 1,2,4-6,22,23,37,38,40,41 and 56-58 is/are rejected.
- 7) Claim(s) 3,24 and 39 is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 03 February 2004 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/1/2004.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4, 22-23, 38-37 and 56-58 rejected under 35 U.S.C. 102(b) as being anticipated by Davantes et al. (US 6252924B1).

Regarding claims 1 and 22, Davantes teaches a method or a computer program for reducing motion-related artifacts in a CT image, comprising:

acquiring a projection data set during one or more slow rotations or a partial rotation of a CT gantry about a dynamic object (column 3 line 9 and column 4 line 8);
determining one or more motion data sets ($D+\Delta D$) representing the motion of the dynamic object over time from the projection data set or from two or more images reconstructed from the projection data set (column 3 line 47-51, 56-58); and

reconstructing one or more motion-corrected images of the object using one or more projections from the projection data set and the respective motion data set corresponding to the one or more projections (column 3 line 67 – column 4 line 1).

Regarding claims 2 and 23, Davantes teaches the dynamic object is a heart (52).

Regarding claim 4, Davantes teaches the projection data set is acquired during one slow rotation of the CT gantry (column 4 line 8).

Regarding claims 37 and 56, Davantes teaches a CT image analysis system, comprising:

a gantry comprising an X-ray source (14) configured to emit a stream of radiation, wherein the gantry rotates slowly;
a detector (18) configured to detect the stream of radiation and to generate one or more signals responsive to the stream of radiation, wherein the detector comprises a plurality of detector elements;

a system controller configured to control the X-ray source and to acquire a set of projection data during one or more slow rotations or a partial rotation of the X-ray source about a dynamic object (52) from one or more of the detector elements via a data acquisition system (32) (column 3 line 9 and column 4 line 8); and

a computer system configured to receive the set of projection data to determine one or more motion data sets ($D+\Delta D$) representing the motion of the dynamic object over time from the set of projection data or from two or more images reconstructed from the set of projection data, and to reconstruct one or more motion-corrected images of the object using one or more projections from the set of projection data and the respective motion data corresponding to the one or more projections (column 47-51, 56-58 and column 3 line 67 – column 4 line 1).

Regarding claims 38 and 57, Davantes teaches the dynamic object is a heart (52).

Regarding claim 58, Davantes teaches a CT image analysis system, comprising:

an X-ray source (14) configured to emit a stream of radiation while rotating slowly on a gantry;

a detector (18) configured to detect the stream of radiation and to generate one or more signals responsive to the stream of radiation, wherein the detector comprises a plurality of detector elements;

a system controller configured to control the X-ray source and to acquire a set of projection data during one or more slow rotations or a partial rotation of the X-ray source about a heart (52) from one or more of the detector elements via a data acquisition system (32);

a computer system (36) configured to receive the set of projection data; and means for acquiring a phase data set ($D+\Delta D$) for the heart; means (36) for determining cardiac motion of the heart (column 3 line 47-51, 56-58);

means for generating one or more motion-corrected cardiac images of the heart (column 3 line 67 – column 4 line 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-6 and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davantes in view of Stonestrom (US 4284896).

Regarding claim 5-6 and 40-41, Davantes teaches the one or more slow rotations or the partial rotation take approximately fifteen seconds per rotation.

Stonestrom teaches a rotation speed of fifteen second (column 2 line 42).

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt CT system of Davantes with the rotation speed as taught by Stonestrom, since the rotation of Stonestrom would provide sufficient time to collect imaging data to reconstruct the image.

Allowable Subject Matter

Claims 7-21, 25-36 and 42-55 allowed over prior art.

Claims 3, 24 and 39 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach a method or apparatus for reconstructing the one or more motion-corrected images comprises warping a reconstruction grid at a view angle in accordance with the motion data set for the view angle and back-projecting the projections corresponding to the view angle onto the warped reconstruction grid as claimed in 3, 7, 24, 25, 39 and 42.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is (571) 272-2494. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272 - 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HKS 1214104
HKS

David Bruce
DAVID V. BRUCE
PRIMARY EXAMINER